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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Yoshii et al.

Art Unit : 1643

Serial No. : 09/554,186

Examiner : Betty J. Forman, Ph.D.

Filed : May 9, 2000

Title : BIOCHIP AND METHOD FOR USING THE SAME

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Commissioner for Patents

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**RESPONSE AND AMENDMENT**

Responsive to the non-final Office Action mailed April 18, 2002 (hereinafter "Office Action"), Applicants respectfully request entry of the amendments and consideration of the remarks set forth herein. The response was initially due July 18, 2002. Applicants submit, herewith, a petition for a two-month extension of time and fee, extending the time to reply up to and including September 18, 2002. Accordingly, this Response is timely filed.

The following documents are also enclosed herewith:

- Transmittal letter;
- Version with markings to show changes made;
- Petition for a two month extension of time and fee; and
- Postcard.

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AMENDMENT

Please amend the application as follows:

In the claims:

Please cancel claims 2, 6, 7, 9, and 20, without prejudice.

Please replace claims 1, 3, 4, 5, 8, 10, 13, 18, 19, 21, and 22 with rewritten claims 1, 3, 4, 8, 10, 13, 18, 19, 21, and 22 as follows:

-- 1. (Twice amended) A biochip comprising:

a surface spotted with a plurality of biopolymers in a predetermined pattern; and  
a storage medium for storing information of the biopolymers to be spotted,

C<sup>1</sup> wherein the storage medium stores information comprising spot location, identity of the biopolymers spotted on each spot location, and the amount of biopolymers spotted on each spot location.

3. (Amended) The biochip of claim 1, wherein the surface and the storage medium are detachable.

C<sup>2</sup> 4. (Amended) The biochip of claim 1, wherein the surface and the storage medium are formed integrally.

5. (Twice Amended) The biochip of claim 1, wherein the storage medium comprises a semiconductor memory which can read/write information in a non-contact state.

C<sup>3</sup> 8. (Twice amended) A method for using a biochip, comprising the steps of:

(a) applying a sample to the biochip, wherein the biochip comprises a surface spotted with a plurality of biopolymers in a predetermined pattern;

C<sup>4</sup> (b) detecting a spot location where the sample has bound;

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cont.  
wherein the biochip comprises a storage medium, wherein the storage medium stores information comprising spot location, identity of the biopolymers spotted on each spot location, and the amount of biopolymers spotted on each spot location; and

(c) storing and displaying information of the biopolymer that has bound with a sample molecule by searching in the data stored in the storage medium based on the spot location bound with a sample molecule.

C5  
10. (Amended) The biochip of claim 1, wherein the storage medium further comprises a covered surface.

C6  
13. (Amended) The biochip of claim 1, further comprising a semiconductor memory support.

C7  
18. (Amended) The biochip of claim 1, wherein the biopolymer comprises a DNA molecule.

19. (Amended) The biochip of claim 1, wherein the biopolymer comprises a protein molecule.

C8  
21. (Amended) The method of claim 8, wherein the biopolymer comprises a DNA molecule.

22. (Amended) The method of claim 8, wherein the biopolymer comprises a protein molecule. --

C9  
{ Please add the following new claims: }

-- 23. (NEW) The biochip of claim 3, wherein biochip further comprises a case member and the surface and the storage medium are detachable from the case member.

24. (NEW) The biochip of claim 4, wherein biochip further comprises a case member and the storage medium is formed integrally with the case member.

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conf  
25. (NEW) The biochip according to claim 1, having about 10,000 spots/cm<sup>2</sup>.

26. (NEW) A method of manufacturing a biochip according to claim 1, comprising the steps:  
spotting a plurality of biopolymers on a surface of the biochip in a predetermined pattern; and  
writing information of the spot locations to the storage medium and associating it with the information of biopolymers spotted on the spot locations.

27. (NEW) A method of using a biochip manufactured according to claim 1, comprising the steps:  
applying a sample to the biochip;  
detecting a spot location where hybridization of a biopolymer has occurred;  
searching the storage medium for information on the biopolymer that has hybridized, the search being based on information about the spot location where hybridization has occurred; and  
displaying the information on the biopolymer that has hybridized.

28. (NEW) The biochip according to claim 1, further comprising a looped antenna, wherein the storage medium is a IC memory connected to the looped antenna, the storage medium thereby being capable of reading/writing information in a non-contact state. --

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## REMARKS

### **Status of the Claims**

Claims 1 to 22 are currently pending. Applicants have elected the species of DNA biopolymers; however, the issue of examining the species of protein biopolymers will be addressed by the Patent Office once the claims drawn to the elected, DNA biopolymers are deemed allowable.

In the instant Response, claims 2, 6, 7, 9, 20 are canceled, without prejudice; claims 1, 3, 4, 5, 8, 10, 13, 18, 19, 21 and 22 are amended, and new claims 23 to 28 are added. Thus, after entry of these amendments, claims 1, 3 to 5, 8, 10 to 19, and 21 to 28 are presented for consideration.

Pursuant to the Office Action, claim 8 is objected to for allegedly containing informalities. Claims 1-22 are rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. Claims 7 and 20-22 are rejected under 35 U.S.C. §101, for allegedly claiming a recitation of use without setting forth any steps involved in the process. Claims 1-4, 6-9, 13, 14, 17-19, 21, and 22 are rejected under 35 U.S.C. §102 as allegedly anticipated by U.S. Patent No. 5,968,728, to Perttunen *et al.* (hereinafter "Perttunen"). Claims 1-22 are rejected under 35 U.S.C. §102 as allegedly anticipated by U.S. Patent No. 6,284,459, to Nova *et al.* (hereinafter "Nova"). Claims 1, 2, and 5-8 are rejected under 35 U.S.C. §102 as allegedly anticipated by U.S. Patent No. 6,215,894, to Zeleny *et al.* (hereinafter "Zeleny"). Applicants respectfully traverse all outstanding objections to the specification and rejections of the claims.

### **Support for the Claim Amendments**

Support for the new claims can be found throughout the specification. In particular, support for claims directed to a biochip having a surface to be spotted with a plurality of biopolymers and a storage medium storing information about spot location, identity of the biopolymers, and the amount of biopolymers spotted can be found, *inter alia*, in originally filed claim 1; at page 3, line 23, to page 4, line 3; page 10, lines 1-18; and page 12, lines 15-20. Support for claims directed to a case member detachably or integrally formed, respectively, can be found *inter alia*, originally filed claims 3 and 4; and at page 7, lines 12-17. Support for claims directed to a biochip having about 10,000 spots/cm<sup>2</sup> can be found, *inter alia*, at least at page 6,

lines 18-19. Support for claims directed to a method of manufacturing a biochip of claim 23, can be found, *inter alia*, at page 3, lines 1-4; and page 4, lines 4-12. Support for claims directed to a method of using the claimed biochip can be found, *inter alia*, at page 4, lines 13-24. Support for claims directed to a biochip having a looped antenna can be found, *inter alia*, at page 7, lines 17-20. Applicants respectfully submit that no new matter has been introduced by the instant amendment.

### **Objections to the Claims**

Claim 8 is objected to for allegedly improperly reciting “and” and an improperly placed comma. The instant amendment addresses this issue.

### **Issues under 35 U.S.C. §112, second paragraph**

Claims 1-22 are rejected under 35 U.S.C. §112, second paragraph, for alleged being indefinite for failing to particularly point out and distinctively claim the subject matter which Applicant regards as the invention.

Claims 1-6 are alleged to be indefinite for reciting “capable of being spotted” as it is unclear to the Patent Office whether the surface is spotted or is in a condition to be spotted at some future time. The Patent Office alleges that it is unclear what structural components of the biochip are being claimed. The instant amendment addresses this issue.

Claims 3 and 4 are alleged to be indefinite for reciting “wherein a member provided with the surface” as it is unclear to the Patent Office how the “member” is “provided” and how or whether the “member” structurally relates to the surface and storage medium. The instant amendment addresses this issue and clarifies how the member relates to the surface and the storage medium.

Claim 6 is alleged to be indefinite for reciting “information of spot locations on the biochip surface in relation to information of the type of biopolymers” because “in relation to” is a non-specific relational phrase and the Patent Office is unclear how the spot information relates to the type of biopolymer information. The instant amendment addresses this issue.

Applicants submit that the rejection of claims for allegedly not setting forth any steps involved in the process, using "relation to" language, and lacking proper antecedent basis have been addressed by the instant amendment.

In light of the amendments and reasons set forth above, Applicants respectfully request withdrawal of the rejection based upon 35 U.S.C. §112, second paragraph.

**Issue under 35 U.S.C. §101**

Claims 7 and 20-22 are rejected under 35 U.S.C. §101 for allegedly reciting a method for using without setting forth any steps involved in the process. The instant amendment addresses this issue.

**Issues under 35 U.S.C. §102**

Claims 1-4, 6-9, 13, 14, 17-19, 21 and 22 are rejected under 35 U.S.C. §102 as allegedly anticipated by Perttunen. Claims 1-22 are rejected under 35 U.S.C. §102 as allegedly anticipated by Nova. Claims 1, 2, and 5-8 are rejected under 35 U.S.C. §102 as allegedly anticipated by Zeleny.

The legal standard for anticipation under 35 U.S.C. §102 is one of strict identity. To anticipate a claim, a single prior source must contain each and every limitation of the claimed invention.

Perttunen discloses a molecular detection device having an arrangement of molecular receptors which is concealed or obscured. The hybridization data can be stored in a member retained by an end user or stored in a database that provides limited access thereto.

Nova discloses combinations, called matrices with memory, where the memory includes electronic and optical storage media.

Zeleny discloses a system for scanning biochip arrays including an image array identifier recorded for each array.

After entry of the instant amendment, the biochips of the claimed invention are directed to a storage medium that stores information comprising spot location, identity of the biopolymers spotted on each spot location, and the amount of biopolymers spotted on each spot location.

Applicants submit that none of the references, Perttunen, Nova, and Zeleny, specifically teaches or suggests storing the amount of biopolymer spotted at each spot in a storage medium. None of these references teaches a storage medium that stores information comprising spot location, identity of the biopolymers spotted on each spot location, and the amount of biopolymers spotted on each spot location. Accordingly, none of the references teaches each and every limitation of Applicants' claimed invention.

In light of the amendments and reasons provided above, Applicants respectfully request reconsideration and withdrawal of the rejection based upon 35 U.S.C. §102.

#### CONCLUSION

Applicants request that the Examiner reconsider the application and claims in light of the foregoing reasons and amendments and respectfully submit that after entry of the instant amendment the claims are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If, in the Examiner's opinion, a telephonic interview would expedite the favorable prosecution of the present application, the undersigned attorney would welcome the opportunity to discuss any outstanding issues and to work with the Examiner toward placing the application in condition for allowance.

Attached is a marked-up version of the changes being made by the current amendment.



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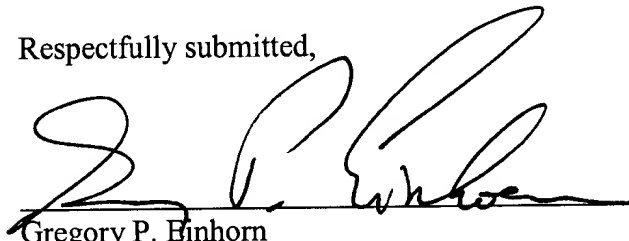
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Date:

Aug 23, 2002

Respectfully submitted,



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